

REMARKS

Applicants have carefully studied the outstanding Official Action. The present remarks are intended to be fully responsive to all points of rejection. Favorable reconsideration and allowance of the present application are hereby respectfully requested.

Applicants thank the Examiner for the courtesy of a telephonic interview granted on 16 February 2006 to Inventor/Applicant Doron Handelman. The substance of the interview is included in the Interview Summary.

In the interview, claims 1 - 17 and a draft response to the Final Rejection of 12 January 2006 were discussed. The Examiner found the argument in the draft against the Benhaddou reference in the combination of Lee and Benhaddou persuasive, but indicated that further search would be needed. The Examiner suggested modifying the claims to be patentably distinct over the claims of the parent US Patent 6,763,191 since the structure is similar. Inventor/Applicant Handelman did not agree to amend the claims based on this patent, explaining that he believes the current spread spectrum feature claimed is a significant difference. The Examiner agreed to withdraw the finality of the 12 January 2006 rejection and Inventor/Applicant Handelman agreed to send an official response with essentially the same argument presented in the draft response.

Claims 1 - 17 were examined and are now pending in the application.

Claims 1 - 17 stand rejected under 35 USC 103(a) as being unpatentable over US Patent 6,288,808 to Lee et al (Lee) in view of an article titled "New Multiprotocol WDM/CDMA-Based Optical Switch Architecture" of Benhaddou et al; Simulation

Symposium 2001. Proceedings. 34<sup>th</sup> Annual, 22 - 26 April 2001, Pages 285 - 291 (Benhaddou).

Lee describes an optical asynchronous transfer mode ATM switch for recovering the limitation of processing capacity and performing large capacity of switching.

Benhaddou describes a non-blocking multiprotocol switch architecture based on WDM and CDMA techniques.

With respect to claim 1, the Examiner refers in the outstanding Official Action to Applicants' arguments filed 31 October 2005 and takes the position as follows:

- (a) That Benhaddou discloses optical signal samples obtained by a WDM spread spectrum technique, and in the combination the Benhaddou teaching applies to the WDM signals from different sources disclosed by Lee, and that, in other words, the upstream sources disclosed by Lee are sending WDM spread spectrum signals downstream in the combination, based on the teaching of Benhaddou applied to the upstream sources of Lee. The Examiner further indicates that it is the WDM spread spectrum signals output from Benhaddou modules that are the upstream spread spectrum signals in the combination, as described in the rejection;
- (b) That the arguments of the Applicants that it is not clear where in the system of Lee the CDMA switches of Benhaddou can be integrated and how the CDMA switches of Benhaddou can operate in the system of Lee are moot because the combination is not based on physically integrating the CDMA switches into the Lee hardware, and that Lee can process the WDM spread spectrum signals of Benhaddou, when received downstream from a Benhaddou module, since the signals in both Benhaddou and Lee are fixed period optical packets using WDM; and

(c) That the signals of both Benhaddou and Lee being fixed period optical packets using WDM provides motivation and suggests that the two teachings could be combined.

Claim 1 refers to switching to a destination route upstream optical signal samples that are obtained from a first source by a spread spectrum technique and upstream optical signal samples that are obtained from additional NCC sources, and recites, inter alia, a combination comprising optically converting the upstream optical signal samples that are obtained from the first source and the upstream optical signal samples that are obtained from the additional NCC sources into a broadband combined series of upstream optical signal samples at a combined data rate  $DR_c$ , and routing the broadband combined series of upstream optical signal samples to the destination route.

Regarding the Examiner's position in (a) - (c) and the respective rejections of claim 1, Applicants respectfully submit that the combination of Lee and Benhaddou as suggested by the Examiner is improper and conflicts with the teaching of Benhaddou because Benhaddou modules do not output WDM spread spectrum signals but rather output signals that are not spread spectrum. In fact, Benhaddou does not show or suggest WDM spread spectrum signals at all.

Specifically, in relation to the functional architecture of the CDMA Switch module, Benhaddou recites, in lines 37 - 38 in column 1 on page 287, as follows:

Cells received at the output ports are  
reassembled in to original packets.

Such reassembly of the cells into the original packets is also clearly evident from Fig. 1b in which the multiplexer which outputs to output port O1 performs queuing and reassembly.

The above recitation and the showing of queuing and reassembly in Fig. 1b clearly indicate that the signals at the output ports O1, ..., Om of the Benhaddou CDMA Switch modules are reassembled packets which are reassembled into the original non-spread spectrum packet form. Thus, the outputs of the Benhaddou CDMA Switch modules are not spread spectrum signals. After being outputted by the CDMA Switch modules, such non-spread spectrum signals are provided to the Optical Multiplexers for multiplexing by WDM, and since the signals provided by the CDMA Switches to the Optical Multiplexers are not spread spectrum signals, the signals outputted by the Optical Multiplexers can only be WDM signals and cannot be WDM spread spectrum signals.

In fact, Benhaddou cannot provide any source of WDM spread spectrum signals because in the system of Benhaddou CDMA signals exist only in an intermediate stage in the CDMA Switches, and immediately at the end of the intermediate stage, before being outputted to the following stage, the CDMA signals are reassembled back into the original non-spread spectrum packet form. Therefore, there is no stage in Benhaddou in which spread spectrum signals are outputted, and there is no stage in Benhaddou in which spread spectrum signals can be multiplexed by WDM to produce WDM spread spectrum signals.

Since in the combination of Lee and Benhaddou neither spread spectrum signals nor WDM spread spectrum signals can be outputted from Benhaddou, Lee cannot receive and process WDM spread spectrum signals from Benhaddou modules. Therefore, at least the following limitations of claim 1 are not met and cannot be met by the combination of Lee and Benhaddou:

(1) Upstream optical signal samples that are obtained from a first source by a spread spectrum technique;

(2) Optical conversion into a broadband combined series of upstream optical signal samples at a combined data rate  $DR_c$ ; and

(3) Routing of the broadband combined series of upstream optical signal samples.

Additionally, Applicants respectfully submit that since the combination of Lee and Benhaddou as suggested by the Examiner uses WDM spread spectrum signals from Benhaddou modules but, as mentioned above, Benhaddou cannot provide any source of WDM spread spectrum signals, the combination of Lee and Benhaddou conflicts with the teaching of Benhaddou, is improper, and teaches away from claim 1. Also, such conflict between the combination of Lee and Benhaddou and the teaching of Benhaddou indicates that there can be no suggestion and no motivation to combine Lee and Benhaddou.

Furthermore, Applicants respectfully point out that if in the combination of Lee and Benhaddou the CDMA Switches of Benhaddou would have been modified to output spread spectrum signals from within the intermediate stage, that is before reassembly of the CDMA signals at the end of the intermediate stage, then such a modification would change the principle of operation of Benhaddou and would render Benhaddou unsatisfactory for its intended purpose and in fact inoperable. The modification would render Benhaddou unsatisfactory for its intended purpose and inoperable because such spread spectrum signals obtained from within the intermediate stages of all the CDMA Switches of Benhaddou would be mixed and destroyed throughout the multiplexing stage of Benhaddou which is performed by the Optical Multiplexers, and would further be mixed and destroyed throughout the system

of Lee.

Since such a modification changes the principle of operation of Benhaddou and renders Benhaddou unsatisfactory for its intended purpose, the combined teachings of Lee and Benhaddou are not sufficient to render claim 1 *prima facie* obvious, and also there can be no suggestion and no motivation to make the modification.

Additionally, Applicants respectfully submit that such a modification is contrary to accepted wisdom in the art because it results in a significant disadvantage of signal broadening with no apparent reason and no alternative advantage. Specifically, Benhaddou introduces the CDMA technique which results in signal broadening in order to obtain various switching advantages, but immediately after acquiring the switching advantages Benhaddou narrows the signals back to their original packet form to avoid the disadvantage of signal broadening. However, the modification which outputs spread spectrum signals from within the intermediate stage before reassembly maintains the disadvantage of signal broadening throughout the rest of the stages in the combination of Lee and Benhaddou contrary to accepted wisdom in the art. Such a proceeding which is contrary to accepted wisdom in the art is evidence of nonobviousness of claim 1 and of the improper rationale for combining Lee and Benhaddou.

Applicants also respectfully submit that neither Lee nor Benhaddou suggest the desirability of the claimed features of claim 1 and therefore the Examiner's position in (c) indicating that the signals of both Benhaddou and Lee being fixed period optical packets using WDM provides motivation and suggests that the two teachings could be combined is in fact incorrect.

Combining Lee and Benhaddou is therefore inappropriate for rejecting claim 1.

Thus, Applicants respectfully point out that the Examiner has failed to establish a *prima facie* case for the unpatentability of claim 1.

Claim 1 is therefore believed to be allowable.

Claims 2 - 5 depend directly or indirectly from claim 1 and recite additional patentable subject matter.

In the outstanding Official Action the Examiner also commonly refers to Applicants' arguments filed 31 October 2005 with respect to claims 2, 4, 7, 8, 10 and 11 and takes the position that the Applicants' arguments are not persuasive because the Applicants do not provide any reasoning that shows a contrast between the claimed features and the citations and reasoning of the rejections.

With respect to claims 2 and 4 Applicants respectfully point out that since claims 2 and 4 depend directly or indirectly from claim 1 a contrast between the claimed features of claims 2 and 4 and the citations and reasoning of the rejections is at least provided by the following: the conflict between the combination of Lee and Benhaddou and the teaching of Benhaddou as mentioned above with reference to claim 1; and the modification which outputs spread spectrum signals from within the intermediate stage before reassembly which is contrary to accepted wisdom in the art as mentioned above with reference to claim 1.

Additionally, Applicants respectfully submit that in fact there is no need for the Applicants to provide any reasoning that shows a contrast between the claimed features and the citations and reasoning of the rejections as argued by the Examiner because the claimed features of claims 2 and 4 are not shown or suggested in Lee and / or in Benhaddou, and

the combined teachings of Lee and Benhaddou also do not suggest the claimed features of claims 2 and 4 and such grounds alone are sufficient to determine the patentability of claims 2 and 4 without necessitating any contrasting grounds.

Claims 2 - 5 are therefore believed to be allowable.

With respect to claim 6, the Examiner refers in the outstanding Official Action to Applicants' arguments filed 31 October 2005 regarding claim 6 and takes the position that the teachings of Lee and Benhaddou apply whether the input signals are coming from an upstream or downstream direction. The Examiner further indicates that "The argument against Lee and Benhaddou as being a one-way architecture is not persuasive because claim 6 does [not] have any limitations that indicate a method of using the same equipment to operate on signals in opposing directions".

Claim 6 refers to switching to nn routes a broadband series of downstream optical signal samples obtained by utilizing a spread spectrum technique, and recites, inter alia, a combination comprising optically converting the broadband series of downstream optical signal samples into nn series of downstream optical signal samples, and routing the nn series of downstream optical signal samples to the nn routes respectively.

Regarding claim 6 Applicants respectfully point out that the arguments submitted above with respect to the patentability of claim 1 also apply to claim 6.

Additionally, Applicants respectfully submit that in contrast to the Examiner's position, the teachings of Lee and Benhaddou do not apply whether the input signals are coming from an upstream or downstream direction, regardless of whether the same or separate equipment is used, because both Lee and Benhaddou lack elements and functionality which are



essential for operation in an opposing direction and the existing elements of Lee and Benhaddou do not provide the necessary functionality for operation in an opposing direction.

Specifically, Lee enables switching and transmission in a direction from Router I towards Router II but Lee lacks the functionality and elements which enable provision of wavelength separation in a direction from Router II towards Router I, which wavelength separation would have been necessary if communication in a direction from Router II towards Router I would have been contemplated. If, for the sake of argument only, communication in a direction from Router II towards Router I would have been contemplated in the system of Lee, then a multi-wavelength signal arriving from Router II in Fig. 7 of Lee would have to be separated into single-wavelength signals that would have to be fed to the branching delay lines 54. However, the coupler 55 in Lee is an nx1 coupler (Lee, col. 6, lines 14 - 17) and as such the coupler 55 does not provide wavelength separation in operation in a direction from Router II towards Router I, but rather distributes the multi-wavelength signal arriving from Router II among all the branching delay lines 54. In order to obtain single-wavelength signals on the branching delay lines 54 as necessary for multiplexing in the AWG 46, the system of Lee would have to use an appropriate filter on each of the branching delay lines 54. However, such filters are not at all shown or suggested in Lee, and Lee does not teach such filters and does not teach operation in an opposing direction, that is a direction from Router II towards Router I.

The architecture of Lee is therefore a one-way architecture suitable for operation in a direction from Router

I towards Router II but inoperable in an opposing direction, that is a direction from Router II towards Router I.

With respect to Benhaddou, Benhaddou lacks the functionality and elements which enable key distribution, header swapping and cell-key multiplication at the side of the multiplexer which performs queuing and reassembly, which key distribution, header swapping and cell-key multiplication at the side of the multiplexer which performs queuing and reassembly would have been necessary if communication in a direction from the Optical Multiplexers (OMs) O1, O2, O3 on the right-hand side of Fig. 1a of Benhaddou towards the Optical Demultiplexers (ODs) I1, ..., Im on the left-hand side of Fig. 1a of Benhaddou would have been contemplated. If, for the sake of argument only, communication in a direction from the OMs towards the ODs would have been contemplated in the system of Benhaddou, then a signal arriving from O1 and directed towards I1, ..., Im in the CDMA Switch shown in Fig. 1b would have to be segmented into a plurality of fixed size cells to become a spread spectrum signal. However, in order to segment the signal arriving from O1 into the plurality of fixed size cells the CDMA Switch of Fig. 1b would have to use, at the side of the multiplexer which performs queuing and reassembly, elements that perform key distribution, header swapping and cell-key multiplication similar to the elements used at the I1, ..., Im input side in Fig. 1b. However, Benhaddou does not show or suggest such elements at the side of the multiplexer which performs queuing and reassembly and Benhaddou does not teach operation in an opposing direction, that is a direction from the OMs towards the ODs.

The architecture of Benhaddou is therefore a one-way architecture suitable for operation in a direction from the

ODs towards the OMs but inoperable in an opposing direction, that is a direction from the OMs towards the ODs.

Since neither Lee nor Benhaddou can teach operation in an opposing direction, the combined teachings of Lee and Benhaddou necessarily cannot teach operation in an opposing direction.

Additionally, since the combination of Lee and Benhaddou cannot provide a broadband series of optical signal samples obtained by utilizing a spread spectrum technique (upstream or downstream) as discussed above with reference to claim 1 and Lee cannot provide wavelength separation in an opposing direction, at least the following limitations of claim 6 are not met and cannot be met by the combination of Lee and Benhaddou:

- (1) Switching to nn routes;
- (2) A broadband series of downstream optical signal samples obtained by utilizing a spread spectrum technique;
- (3) Optically converting the broadband series of downstream optical signal samples into nn series of downstream optical signal samples; and
- (4) Routing the nn series of downstream optical signal samples to nn routes respectively.

Additionally, since each of the systems of Lee and Benhaddou is inoperable in communication in an opposing direction, then there can be no suggestion and no motivation to combine Lee and Benhaddou and a person skilled in the art would not have been expected to combine Lee and Benhaddou.

Combining Lee and Benhaddou is therefore inappropriate for rejecting claim 6.

Thus, Applicants respectfully point out that the Examiner has failed to establish a *prima facie* case for the

unpatentability of claim 6.

Claim 6 is therefore believed to be allowable.

Claims 7 and 8 depend from claim 6 and recite additional patentable subject matter.

Additionally, regarding the Examiner's common position with respect to claims 2, 4, 7, 8, 10 and 11 Applicants respectfully point out that since claims 7 and 8 depend from claim 6, a contrast between the claimed features of claims 7 and 8 and the citations and reasoning of the rejections is at least provided by the combination of Lee and Benhaddou being inoperable in an opposing direction. Also, since the arguments submitted above with respect to the patentability of claim 1 also apply to claim 6, additional contrasts between the claimed features of claims 7 and 8 and the citations and reasoning of the rejections are as mentioned above with respect to the arguments submitted regarding the patentability of claims 2 and 4.

Furthermore, the arguments submitted above for claims 2 and 4 regarding there being no need to provide any reasoning that shows a contrast between the claimed features and the citations and reasoning of the rejections also apply to claims 7 and 8.

Claims 7 and 8 are therefore believed to be allowable.

Claim 9 is apparatus claim corresponding to claim 1. The arguments submitted above with respect to the patentability of claim 1 also apply to claim 9.

Claim 9 is therefore believed to be allowable.

Claims 10 and 11 depend from claim 9 and recite additional patentable subject matter.

Additionally, the arguments submitted above with respect to the patentability of claims 2 and 4 also apply to claims 10 and 11.

Claims 10 and 11 are therefore believed to be allowable.

Claim 12 is apparatus claim corresponding to claim 6. The arguments submitted above with respect to the patentability of claim 6 also apply to claim 12.

Claim 12 is therefore believed to be allowable.

Claims 13 and 14 depend from claim 12 and recite additional patentable subject matter.

Claims 13 and 14 are therefore believed to be allowable.

The arguments submitted above with respect to the patentability of claim 1 also apply to claim 15.

Claim 15 is therefore believed to be allowable.

Claim 16 depends from claim 9 and recites additional patentable subject matter.

Claim 16 is therefore believed to be allowable.

Claim 17 depends from claim 12 and recites additional patentable subject matter.

Claim 17 is therefore believed to be allowable.

In view of the foregoing remarks, it is respectfully submitted that the present application is now in condition for allowance. Favorable reconsideration and allowance of the present application are respectfully requested.

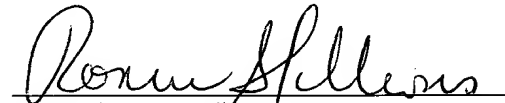
Appln. No. 09/976,243  
Amd. dated October 31, 2005  
Reply to Office Action of January 12, 2006

If the examiner has any questions, he is invited to  
contact the undersigned at the number listed below.

Respectfully submitted,

BROWDY AND NEIMARK, P.L.L.C.  
Attorneys for Applicant

By

  
Ronni S. Jyllions  
Registration No. 31,979

RSJ:cak  
Telephone No.: (202) 628-5197  
Facsimile No.: (202) 737-3528  
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